

High Resolution Silicon Deformable Mirrors, Phase II

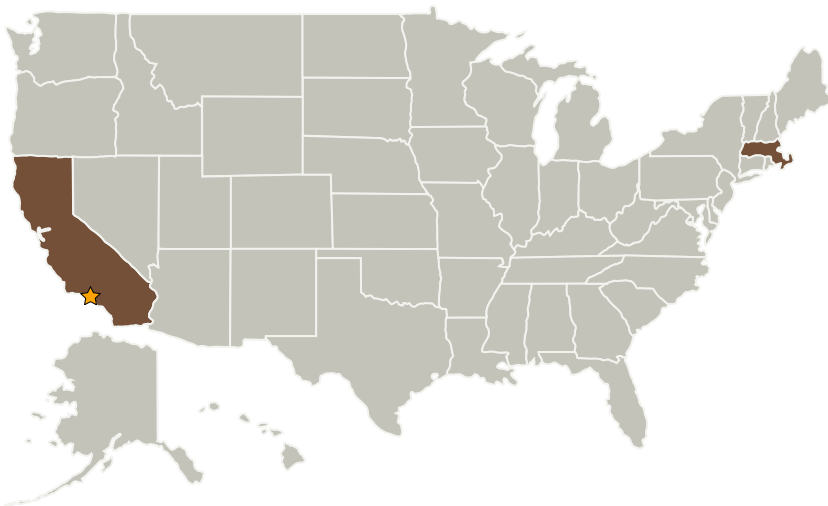
Completed Technology Project (2006 - 2008)



Project Introduction

In this proposal we describe a plan to build a deformable mirror suitable for space-based operation in systems for high-resolution imaging. The prototype DM will be fabricated through a combination of micromachining and wafer bonding steps that were all proven feasible in the Phase I project. The device will rely on single crystal silicon for all structural components, promising unprecedented thermal stability and optical quality. A principal goal of this Phase II SBIR project will be to fabricate a high precision microelectromechanical (MEMS) deformable mirror with a 60mm optical diameter, having surface roughness less than 5nm RMS. The mirror will be supported by 1600 independently controllable electrostatic actuators, each capable of up to 1mm of stroke with sub-nanometer repeatability. The device will become an enabling component for applications including space-based imaging, optical communication, and lithography.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory (JPL)	Lead Organization	NASA Center	Pasadena, California
Boston Micromachines Corporation	Supporting Organization	Industry	Cambridge, Massachusetts



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations

California

Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.2 Observatories
 - └ TX08.2.1 Mirror Systems